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# A review of the West African skink genus *Cophoscincopus* Mertens (Reptilia: Scincidae: Lygosominae): resurrection of *C. simulans* (Vaillant, 1884) and description of a new species

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**A review of the West African skink genus *Cophoscincopus* Mertens (Reptilia: Scincidae: Lygosominae): resurrection of *C. simulans* (Vaillant, 1884) and description of a new species. -** The taxonomy of the West African scincid genus *Cophoscincopus* is reviewed. Based on external and genital morphology the so far monotypic genus can be partitioned into three very similar species. Besides *Cophoscincopus durus* (Cope, 1862) the name *Cophoscincopus simulans* (Vaillant, 1884) is available for one of these forms. The third, up to now, unnamed form is herein described as *Cophoscincopus greeri* sp. n. A key to the species is provided and informations about ecology and distribution are given. We revealed the presence of large, multicellular integumentary glands (located post-cloacally), which are described for the first time in the genus.

**Key-words:** Reptilia - Scincidae - Lygosominae - *Cophoscincopus* - *C. durus* - *C. simulans* - *C. greeri* sp. n. - taxonomy - postcloacal glands - West Africa.

## INTRODUCTION

The genus *Cophoscincopus* consists of small, semi-aquatic skinks which are known to inhabit the closed forests of Africa north of the Gulf of Guinea, from Sierra Leone and southern Guinea east to Togo (Müller, 1910; Mertens, 1933).

Until recently the genus *Cophoscincopus* was considered to be monotypic. The single species *C. durus* was originally described as *Tiliqua dura* by Cope (1862) and was based upon a single West African specimen. Cope (l. c.) characterised this species, among other traits, by the presence of supranasals, a very tiny outer ear opening and strongly tricarinate scales on the back.

A second West African lizard of similar habitus was described by Vaillant (1884) in his new genus *Cophoscincus* as *C. simulans*. According to the original description, this species is in part characterised by the absence of either supranasals or an outer ear opening and by tricarinate scales on the back, in which the middle keel is dominating in size.

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Despite these seemingly clear differences Boulenger (1887) indicated that he thought *Cophoscincus simulans* to be a synonym of *Tiliqua dura*, but without further discussing this issue. Boulenger (l.c.) also transferred both forms to the genus *Lygosoma*, as the genus *Tiliqua* had been restricted to Australasian forms.

In contrast to this point of view, Tornier (1901) considered *Cophoscincus simulans* and *C. durus* to be two distinct species within the genus *Lygosoma*. He argued that *Lygosoma simulans* differed in part from *L. durum* in the following characters: no supranasals, rostral in contact with the frontonasal, the latter not touching the frontal, no enlarged nuchals, no ear opening, three keels on the back scales, the middle one the largest.

Müller (1910), after having received a larger series of new specimens from Liberia, discovered that a tiny ear opening was always present in both *L. durum* and *L. simulans*, though it can be often hidden by overlapping scales. Furthermore he found one specimen in which the internasal was divided by an azygous scale, which otherwise exactly fitted the description of *Tiliqua dura* Cope, 1862. He concluded that Cope had misidentified the divided internasal as two supranasals, and the azygous scale as an internasal. Also as Cope did not specifically describe the exact status of the keels on the dorsal scales, he considered the different descriptions of the middle keel as being within the limits of variability. Having discarded the principal differences between the two species, he concluded that *Lygosoma simulans* is a junior synonym of *Lygosoma durum*.

Mertens (1933) reviewed *Lygosoma durum* and principially agreed with the arguments of Müller (l. c.). He nonetheless found the species to be distinct enough from the other known species of *Lygosoma* to put it in a genus of its own. As *Tiliqua* was still restricted to Australasian species, the next available name was *Cophoscincus* Vaillant, 1884. But Mertens also noted that this name was preoccupied by *Cophoscincus* Peters, 1867 (type species *Lygosoma quadrivittatum* Peters, 1867). Therefore he erected the new name *Cophoscincopus*, with the single species *Cophoscincopus durus*. This arrangement has been followed by all subsequent authors (e.g. Mittleman, 1952; Hoogmoed, 1973; Greer, 1974; Joger, 1981). The history of nomenclatural changes is summarized in the following list:

1862 *Tiliqua dura* Cope, Proc. Acad. Philadelphia 1862: 190. Type specimen: USNM 5996; western Africa.
1884 *Cophoscincus simulans* Vaillant, Bull. Soc. Philomath. 8 (7): 170. Type specimen: MNHN 6457; Crouacrou, Ghana.
1884 *Cophoscincus simulans* – Vaillant, Bull. Soc. Zool. France 1884: 349.
1887 *Lygosoma durum* – Boulenger, Cat. Lizards III: 304.
1893 *Cophoscincus simulans* – Matschie, Mitteil. deutsch. Schutzgeb. 6 (3): 4.
1901 *Lygosoma simulans* – Tornier, Arch. F. Naturgesch. 1901, Beiheft: 86.
1910 *Lygosoma durum* – Müller, Zool. Anz. 35 (9/10): 266-269.
1921 *Lygosoma simulans* – Chabanaud, Bull. Comité d'Etudes Hist. Sci. l'Afrique Occidentale Française: 445-472.
1933 *Cophoscincopus durus* – Mertens, Zool. Anz. 102: 188-190.
1938 *Cophoscinopus durus* – Loveridge, Proc. New England Zool. Club 17: 49-74.
1952 *Cophoscincopus durus* – Mittleman, Smithson. misc. Coll. 117: 1-35.

1973 *Cophoscincopus durus* –Hoogmoed, Die Aquarien- u. Terr.-Zeitschr. 5: 174-178; 7: 217-222, 8: 282-283.
1974 *Cophoscincopus durus* – Greer, Aust. J. Zool., Suppl. Ser. No 31; 67 pp.
1979 *Cophoscincopus (durus)* – Greer, Rec. Aust. Mus. 32: 339-371.
1981 *Cophoscincopus durus* – Joger, Bonn. zool. Beitr. 32: 297-340.

Based on unpublished data kindly provided to us by Allen Greer, further investigations based on morphological and hemipenial data confirmed that the genus *Cophoscincopus* actually consists of three, though very similar, species. Whereas names are available for two of these forms, the third yet unnamed species is described below.

## MATERIAL AND METHODS

Specimens included in the present study are kept in the following museums: BMNH - Natural History Museum, London; FMNH - Field Museum of Natural History, Chicago; HLMD - Hessisches Landesmuseum Darmstadt; MCZ - Museum of Comparative Zoology, Cambridge/Mass.; MHNG - Muséum d'histoire naturelle, Genève; MNHN - Muséum National d'Histoire Naturelle, Paris; RMNH - Natuurhistorisch Nationaalmuseum, Leiden; ZFMK - Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn; ZMB - Zoologisches Museum Berlin.

Measurements were taken as follows: *External morphology*: Snout-vent length (SVL) from tip of snout to vent and tail length (TL) from vent to tail tip were measured with a ruler to the nearest 1.0 mm; other measurements were done with dial callipers and recorded to the nearest 0.1 mm. *Genital morphology*: Whereas the hemipenes of the holotype of *Cophoscincopus greeri* sp. n. were available to us in a completely everted condition, the available hemipenes of *C. durus* (ZFMK 36127-8, 36137-8, 36142-3, 36146, 36153) were only partially everted. Due to a new technique (Pesantes 1994, Ziegler & Böhme 1997) which allows to evert and study the hemipenes not only of fresh material, but also of specimens previously preserved in alcohol, it was possible to reconstruct the shape of completely everted hemipenes in *Cophoscincopus durus* of ZFMK 36128 (SVL: 4.8; TL: 4.5; HPL: 0.5 cm). Hemipenes of *C. simulans* were not available in the framework of the present study. Terminology of genital morphology follows Böhme (1988) and Ziegler & Böhme (l.c.). HPL - Hemipenis length, from cloacal base-point to apex.

## RESULTS

### Resurrection of *Cophoscincopus simulans*

As explained above, the description of *Cophoscincopus simulans* as a distinct species was the direct consequence of Cope's misinterpretation of the head scales in his original description of *C. durus* and the fact that some of the used diagnostic characters are highly variable in the genus. Therefore it seemed justifiable to keep *C. simulans* as a synonym to *C. durus* until today. Our analysis of the new material, which was collected since the last revision of the genus by Mertens (1933), clearly

demonstrates *C. simulans* not to be conspecific with *C. durus*. However, we are basing its diagnosis on additional key characters and the two species can consequently be differentiated as follows:

***Cophoscincopus durus*** (Cope, 1862)

*Tiliqua dura* Cope, 1862: 190; type specimen: USNM 5996; western Africa.

*Diagnosis*. Differs from *C. simulans* in the following combination of characters: frontonasal longitudinally divided (comp. Fig. 1); prefrontals either usually separated by a medial azygous scale or, less frequently, in direct contact vs. usually separated or, less frequently, in direct contact in *C. simulans* (see Figs. 1-3 in Müller 1910; Table 1, this paper); anterior loreal double; posterior loreal and ventral preocular distinct; size slightly smaller (max. SVL = 55 mm vs 61 mm for *C. simulans*).

***Cophoscincopus simulans*** (Vaillant, 1884)

*Cophoscincus simulans* Vaillant, 1884: 349; type specimen: MNHN 6457; Crouacrou, Ghana.

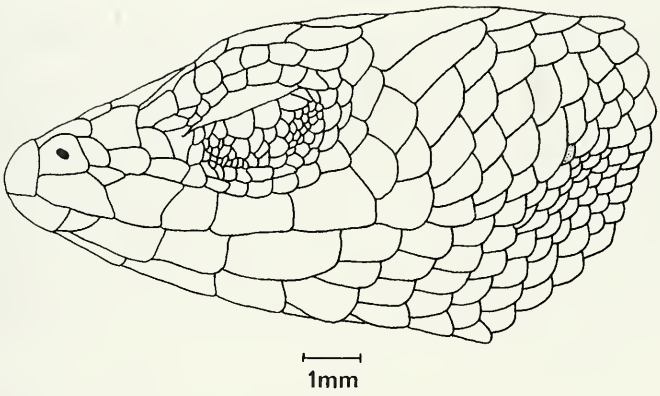
*Diagnosis*. Differs from *C. durus* in the following two characters: frontonasal entire; posterior loreal fused to lower preocular; Furthermore it is characterised by: paravertebral scales 39-48; external ear opening small but generally evident in lateral view (comp. Fig. 2).

*Remarks*. Our new careful examination of the specimens also revealed for the first time the presence of post-cloacal glands in the genus *Cophoscincopus*. The openings of these glands are located along the central part of the first row of scales posterior to the soft scaleless lining of the cloaca. They lie either between the cloacal lining and a scale of the first row or between two scales. This area is normally covered by the pre-anal flap and this flap must be reflected and the area cleaned in order to see the gland openings to full advantage. They are identified most easily by their semi-solid, yellowish-brown exudate. The glands occur only in males and their openings are first identifiable grossly only in males approaching sexual maturity (on gross gonadal criteria).

The post-cloacal glands can furthermore be used to differenciate between *Cophoscincopus durus* and *Cophoscincopus simulans*: In *C. durus* the gland openings occur between the scales of the first row and hence are rather obliquely elongate whereas in *C. simulans* they open anterior to the scales and are circular. In all three species the openings are largest medially and diminish in size laterally.

## Description of a third species

Furthermore we found a third form which seems to be closely related to *C. simulans*, but being at the same time clearly distinct from it. For this species, there is no name available and it is described here as:



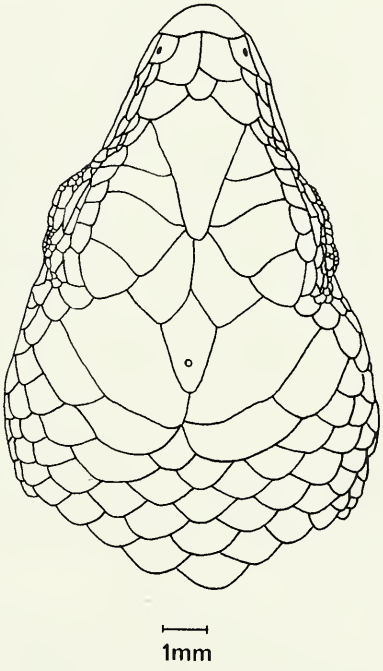




FIG. 1
Head portrait of *Cophoscincopus durus* (ZFMK 36141)

***Cophoscincopus greeri*** sp. n.

*Holotype*: ZFMK 57599, ♂, Mt. Nimba, 1800 m a.s.l., SE-Guinea, coll. Wolfgang Böhme, Fig. 3. SVL: 5.9; TL: 7.7; HPL: 0.6 cm.

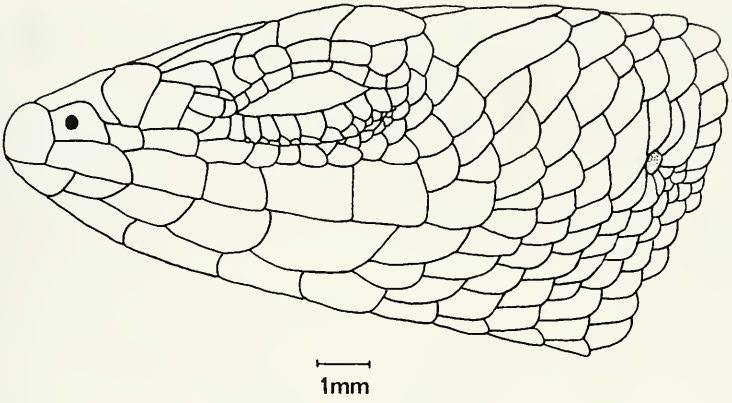
*Paratypes*. BMNH 1903.4.24.1-3: Abuasi, Ghana; BMNH 1930.6.9.14: Okurom River, Begoro, Akim, Ghana; BMNH 1921.11.12.6-7: N'Zebela, French Guinea; BMNH 1960.1.3.60: Tingi Hills, Sierra Leone; BMNH 1962.912: W.A.C.R.I., Tafua, Ghana; FMNH 190998: 48 km N of Koforidua, Tafo, Ghana. MNHN 20.128-130, MNHN 20.132 (two specimens), MNHN 20.135 (four specimens), MNHN 20.134 (one of two specimens): N'Zebela, SE Guinea; MNHN 1943.53-54: Yalenzou, SE Guinea; MNHN 1943.56-57: Kéoulenta, SE Guinea; MNHN 1951.118: Crète de Nion, 1500 m, Massif du Nimba, SE Guinea; MNHN 1951.124-126, MNHN 1951.142: Ziéla, SE Guinea; MNHN 1951.134-137: Zougue, 1050 m, SE Guinea; MNHN 1963.404-405: Macenta, SE Guinea; MNHN 1963.412-416: Mt. Nimba, 1580 m, SE Guinea; RMNH 17242, RMNH 18806, RMNH 18809: Amedzofe, Togo; MCZ 51512: Bintumane Mts., Sierra Leone; ZFMK 20208-9: Mt. Tonkoui, Ivory Coast; ZMB 11251: Togo; ZMB 16061: Misahöhe, Togo.

*Other material*: The following series was recently discovered far from the known area of the species (and genus!) and has therefore not been included in the type series: HLMD 2515-19, S Niokolo Koba NP, SE Senegal.

*Diagnosis*: A large species of *Cophoscincopus* (for definition of the genus see Mertens, 1933 and below) with a total maximum length of 165 mm. It differs from all other species of *Cophoscincopus* in the following combination of characters: frontonasal entire; posterior loreal fused to lower preocular (vgl. Fig 3); size slightly larger (max. SVL = 66 mm vs. 61 mm for next largest species); paravertebral scales 45-57, but only one specimen below 48 vs. 39-48 for other species; external ear opening very small and almost always hidden by overlapping scales.

Body elongated, habitus ± mabuiform with well developed extremities. Tail round, slightly flattened laterally. Head relatively pointed. Prefrontal in contact or widely divided by the frontal. A tiny outer ear opening is present but generally hidden by overlapping scales. Anterior loreal undivided. Dorsal head scales with weak longitudinal ridges or smooth. Dorsal neckscales weakly keeled. As in *C. durus* the gland openings occur between the scales of the first row and hence are rather obliquely elongate. Colour of dorsum dark brown, ventral colour whitish. The hemipenes of *C. greeri* sp. n. (Fig. 4a) differ from those of *C. durus* (Fig. 4b) mainly in lacking (1) well developed terminal lobes (the uniformly unpaired apex which Böhme [1988] stated for the hemipenes of *C. durus* was based on terminally not completely everted hemipenes), (2) a terminally distinctly divided sperm groove, and (3) a well defined collar-like ornamentation ("kragenartiger Ringsaum" sensu Böhme, 1988) at the upper trunk of the organ.

*Description of holotype*: Snout-vent length: 59 mm, tail length: 77 mm. Body slender, elongated, tail round, slightly flattened laterally; degree of lateral flattening increases towards tail tip. Limbs well developed, long, pentadactyl; if adpressed to the body, slightly overlapping. Head relatively pointed, its width smaller than that of the back, only marginally set off from the latter. Distance of tip of snout from anterior edge of eye two-thirds of the distance from the posterior edge of the eye to ear opening. Latter tiny, generally hidden, about twice as wide as high. Frontonasal undivided, about one-third as wide as deep. Two undivided loreal scales. Anterior loreal small, triangular. Posterior loreal more or less quadrangular, about three times



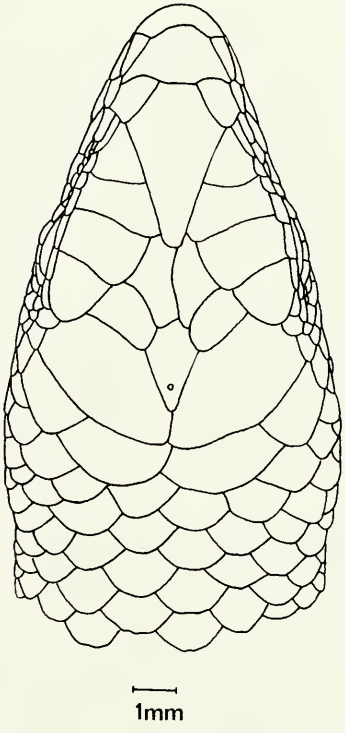




FIG. 2

Head portrait of *Cophoscincopus simulans* (MNHN 1967.187) (The subdivided frontoparietals of *C. simulans* are a unique variant).

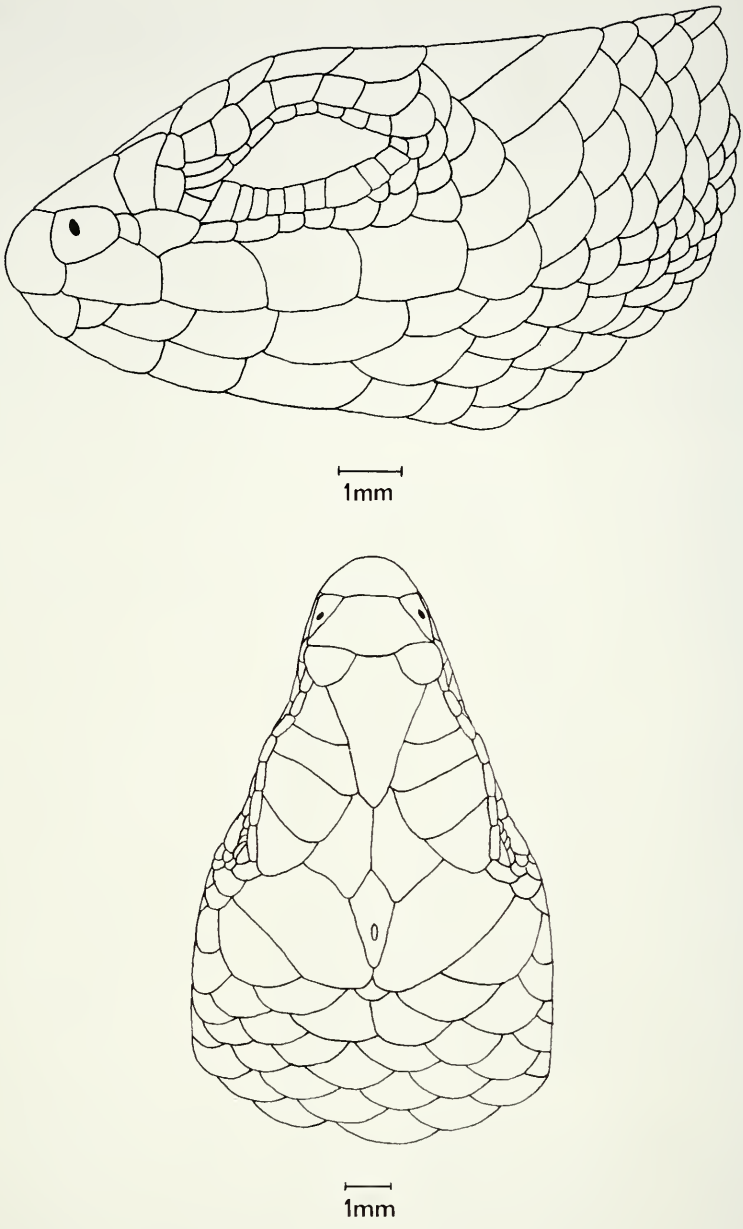



FIG. 3
Head portrait of the holotype of *Cophoscincopus greeri* sp. n. (ZFMK 57599)

as long as high, four times as large as the anterior loreal, slightly narrowing towards the latter. Prefrontals widely separated from each other by the frontal, subtriangular, about as large as the nasal. Frontal longer than its distance from the tip of snout, narrowing to a tip posteriously, about as large as the parietals. Frontoparietals half the size of the frontal, equally long but twice as large as the interparietal. Latter narrowing to a tip posteriously. Parietals about twice as long as large, touching each other only in a small suture. A tiny round occipital scale present. 5-6 supralabials, the fourth bordering the eye. 51 paravertebral scales. Nearly no ridges on the head scales. Dorsal neck scales slightly keeled. Ventrals slightly enlarged. 67 subcaudals, number of subcaudal scale rows decreasing from 5 at the anal opening to 1 at the tailtip. Dorsal and lateral scales on tail strongly keeled.

Dorsal colour (in preservative) dark brown, brightening laterally. On the lateral sides four rows of round white spots, which run from the neck to about the middle of the tail. Throat grey, slowly merging into the light colour of the ventral scales. Ventral side whitish, unspotted (in life, it was bright salmon-red: see Fig. 26 in Böhme, 1994). Dorsally, above the vertebral column two very weak rows of white spots, slowly disappearing from the neck to the anal region.

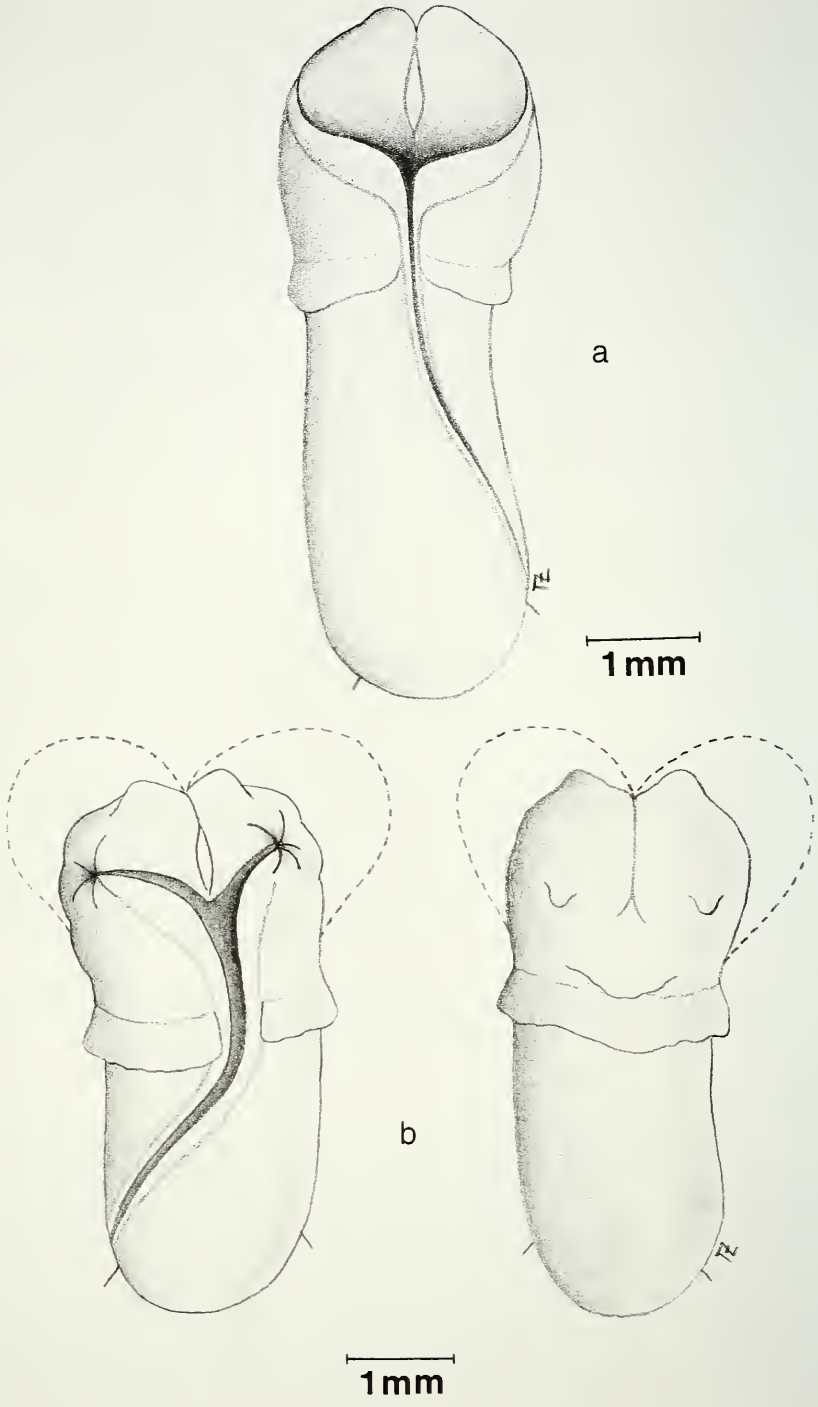
Hemipenes slender, longish, partially transparent and apically slightly widened. At the upper truncus an inconspicuous, hardly recognizable collar-like ring (purposely slightly accentuated in Fig. 4a), which is closed around the truncus except for the sulcus spermaticus. The sulcus is surrounded by inconspicuous sulcal lips and widens laterally at the lower apex. Terminally the apex is medially slightly divided but is lacking well-defined lobes. At the sulcal side the terminal division of the apex turns into a longish flap nearly reaching the forking point of the sperm groove. No remarkable structures were discernible at the asulcal surface of the apex. Besides the whole apical area is densely covered with delicate pustules, not discernible from Fig. 4a.

Variation of paratypes: The paratypes agree generally well with the above description. Only in about 5% of the specimens examined the prefrontals are in contact with each other (see Tab. 1). In the living female paratypes, the colouration of the belly is distinctly sexually dimorphic: light yellowish instead of salmon-red in the male.

*Etymology*: We dedicate the new skink to Dr. Allen Greer to acknowledge his valuable help, which was indispensible for the completion of this paper.

## Redefinition of the genus

A new, generalized definition of the genus *Cophoscincopus* can be given as follows: It belongs to the beta subgroup of the *Eugongylus* group sensu Greer (1974). It differs from all other members of this subgroup in the following combination of derived characters: the supranasals are absent; the upper preocular and prefrontal are in contact (they thereby separate the first supraciliary and posterior loreal); the external ear opening is small; there are usually six supralabials, the fourth lies usually below centre of eye; the dorsal scales are densely shagreened. - Type species: *C. durus* (Cope, 1862); Species included: *C. simulans* (Vaillant, 1884); *C. greeri* sp. n.


a
1 mm
b
1 mm

KEY TO THE SPECIES OF *COPHOSCINCOPUS*

1 Frontonasal longitudinally divided; prefrontals either separated by an azygous median scale or in contact; anterior loreal double; posterior loreal and lower preocular distinct; 38-48 paravertebral scales ..... *durus*

– Frontonasal entire; prefrontals either separated by frontonasal-frontal or in contact; anterior loreal single; posterior loreal and lower preocular fused ..... 2

2 Size slightly larger (max. SVL = 66 mm); paravertebral scales 45-57 (but only one specimen with fewer than 48); external ear opening minute and generally hidden by overlapping scales; on neck, dark colour of dorsum grades gradually into light ventral colour; dorsal head scales with only weak longitudinal ridges or none at all; dorsal neck scales weakly keeled ..... *greeri*

– Size slightly smaller (max. SVL = 61 mm); paravertebral scales 39-48; external ear opening small and generally evident; on neck, usually a black mid-lateral stripe slightly distinct from brown of dorsum and sharply distinct from brownish yellow of venter; head scales with moderately strong longitudinal ridges; dorsal neck scales moderately to strongly keeled ..... *simulans*

DISTRIBUTION OF *COPHOSCINCOPUS*

The genus *Cophoscincopus* is restricted to West Africa and is distributed from Senegal, Sierra Leone and southern Guinea east to Togo (Chabanaud, 1921; Barbour & Loveridge, 1930; Loveridge, 1938; Hoogmoed, 1973; Joger, 1981) (see Fig. 6).

*C. durus* is known only from Sierra Leone, Liberia and southern Guinea. It is recorded herein for the first time from the Ivory Coast (Voucher specimen: ZFMK 68759, Tai National Park).

*C. simulans* occurs from Sierra Leone, Liberia and southern Guinea east through the Ivory Coast and Ghana to Togo.

*C. greeri* sp. n. is the most widespread of the three species: It is currently known from Senegal and Sierra Leone as well as from the extreme SE of Guinea eastwards through Ivory Coast and Ghana to Togo. It has not yet been recorded from Liberia.

FIG. 4

a) Sulcal view of the right hemipenis of the holotype of *Cophoscincopus greeri* (ZFMK 57599), b) Left sulcal, right asulcal view of the left hemipenis of *C. durus* (ZFMK 36127) from Liberia (SVL: 4.9; HPL: 0.4 cm).
The mode of completely everted lobes in the hemipenis of *C. durus* is indicated by the broken lines (in the case of completely everted lobes the lateral branches of the sulcus spermaticus are ending laterally of each lobe); not discernible from the hemipenis drawings is a delicate and dense pustular apical surface.

TABLE 1

Comparison between the three species of *Cophoscincopus* in certain interspecifically variable characters.

| | *durus* | *simulans* | *greeri* |
|---|---|---|---|
| Prefrontals (% of NB) | | | |
| Meet | 13 | 25 | 5 |
| Separated by azygous scale | 87 | - | - |
| Separated | - | 75 | 95 |
| N | 179 | 79 | 20 |
| Paravertebral Scales | | | |
| Range | 38-48 | 39-48 | (45) 48-57 |
| Mean | 43.7 | 43.0 | 51.4 |
| S.D. | 1.62 | 1.89 | 2.24 |
| N | 100 | 45 | 48 |
| Snout-vent Lenght (mm) | | | |
| Range | 23-55 | 24-61 | 27-66 |
| N | 196 | 118 | 47 |
| Tail Length (% SVL) | | | |
| Range | 1.12-1.45 | 1.29-1.61 | 1.31-1.50 |
| N | 83 | 20 | 8 |
| Size of gravid ♀♀ | | | |
| Range | 43-54 | 47-58 | 48-63 |
| N | 28 | 19 | 7 |
| Clutch Size | | | |
| 1 | 1 | - | - |
| 2 | 25 | 16 | 5 |
| 3 | 1 | 3 | 2 |
| 4 | - | - | 2 |

There are several localities where the species occur in sympatry: All three species have been recorded from Kéoulenta and Ziéla, Guinea; *durus* and *simulans* from Macenta, Mt. Nimba and Yalenzou, Guinea, and *simulans* and *greeri* from Amedzofe, Ghana. No doubt more thorough collecting would reveal additional cases.

## HABITATS, ECOLOGY AND REPRODUCTION OF *COPHOSCINCOPUS*

Up to now, there is only little information available regarding the habitats and the autecology of *Cophoscincopus*. All species are mainly found in the vicinity of small creeks and pools in forested areas. The animals are active on the surface by day. If disturbed, they flee either into earth holes, under various rotten logs etc. or mostly into water. They swim under the water surface by lateral undulations with limbs adpressed to body and tail (Scherer in Müller, 1910; Chabanaud, 1921; Bequaert in Barbour & Loveridge, 1930; Harley in Loveridge, 1938; Hoogmoed, 1973 and Joger, 1981). Their prey comprises, in part, termites and spiders (Loveridge, 1938). All species are oviparous with clutch sizes of 1-4 eggs (Loveridge, 1938; Hoogmoed, 1973 and Table 1, this paper).

FIG. 5
*Cophoscincopus greeri* sp. n., holotype in life.

The holotype of the new species was collected at the Guinean side of Mt. Nimba at an altitude of ca. 1200 m a.s.l., in a fast-running, cold mountain creek within the submontane forest zone (among else characterised by the tree fern *Cyathea manniana*). Next to the specimen itself (Fig. 5), also its habitat has been figured by Böhme (1994), however, still using the name *C. simulans*. The same name was used for the two female paratypes from a partly cleared lowland forest site at Malweta river (Forêt de Ziama, SE Guinea), with interspersed cocoa (*Theobroma cacao*) trees.

Joger (1981: 329), who collected two ZFMK paratypes of *C. greeri* sp. n., reports that they "were collected in a cool, shallow creek, where they dived like newts, and hid themselves under stones". MNHN 1951.126 was collected in or on the edge of a "marigot"; MNHN 1951.142 has the word "swamp" associated with it in the registers, and MNHN 1951.134-137 the words "gallery forest".

In view of the habitual, external overall similarity, it is surprising how many cases of broad sympatry have already been found (cf. Fig. 6). Clearly it would be interesting to learn more about the niche segregation of these highly specialized lizards.

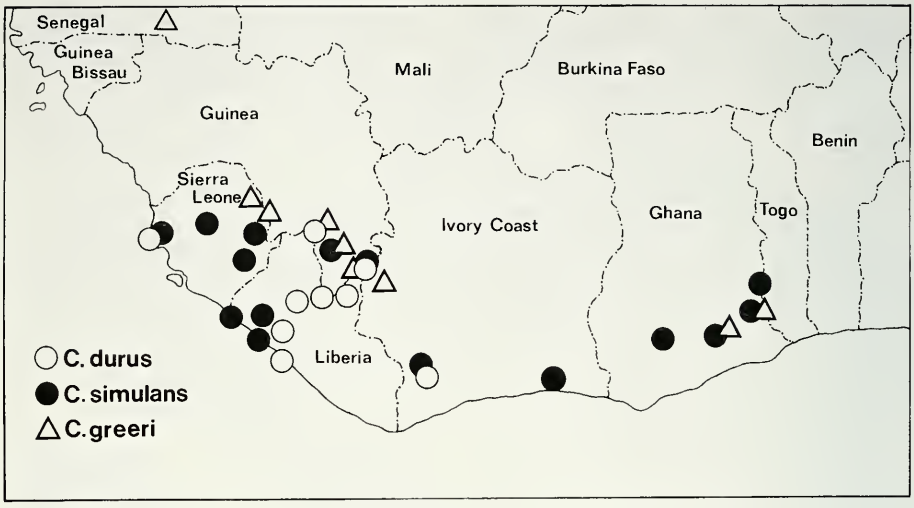



FIG. 6

West Africa north of the Gulf of Guinea showing the distribution of the three species of *Cophoscincopus*.

## ACKNOWLEDGEMENTS

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